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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/730,982	12/10/2003	Atuhito Mochida	2003_1798A	5135

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EXAMINER

EDMONDSON, LYNNE RENEE

ART UNIT	PAPER NUMBER
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1725

DATE MAILED: 04/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/730,982

Applicant(s)

MOCHIDA ET AL.

Examiner

Lynne Edmondson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 18-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 18-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 18, 20, 21, 26 and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Matsushita (JPN 2002-217480 A).

Matsushita teaches a method of mounting a semiconductor component by heating the submount on a heating table and positioning the component which is heated by a collet on the submount with pressure. Pressure is applied after heating is stopped. Material is reheated after solidification (figures 1a-1c, paragraphs 4-7, 18-20 and 26).

3. Claims 18, 21, 22, 24, 26, 29, 30 and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamane et al. (US 2005/0141579 A1).

Yamane teaches a method of mounting a semiconductor component by heating the submount on a heating table and positioning the component which is heated by a collet on the submount with pressure. Pressure is applied after heating is stopped.

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Material is reheated (paragraph 22) after solidification by forced air cooling (paragraphs 8-10 and 101-103).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 18-22, 29 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ho et al. (USPN 6897410 B1) in view of Yamazaki et al. (USPN 6142356).

Ho teaches a method of mounting a semiconductor component by heating the submount on a heating table and positioning the component which is heated by a collet (12) which has a portion larger than the component (figures 4 and 5) wherein the heaters may be operated simultaneously or separately (col 6 line 40 – col 7 line 4 and col 7 lines 48-67). The collet moves vertically (col 6 lines 2-11). (figures 1, 4, col 1 lines 9-45, col 2 line 60 – col 3 line 27). The bonding materials comprises lead free solder which typically comprises at least two metals with different fusing points. In a rework process the member would be heated again after solidification (col 9 line s3-9). Although vertical movement is disclosed, there is no positive recitation of pressure.

Yamazaki teaches a conventional bonding process wherein the collet applies heat and pressure to the component (abstract and col 6 lines 32-64).

It would have been obvious to one of ordinary skill in the art at the time of the invention to apply pressure with the collet as is conventional to ensure proper alignment and reliable bonding.

6. Claims 23, 25, 31, 33 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ho et al. (USPN 6897410 B1) in view of Yamazaki et al. (USPN 6142356) as applied to claims 18-22 and 30 above, and further in view of Powers et al. (US 2004/0195297 A1).

Ho teaches a method of mounting a semiconductor component by heating the submount on a heating table and positioning the component which is heated by a collet (12) which has a portion larger than the component (figures 4 and 5) wherein the heaters may be operated simultaneously or separately (col 6 line 40 – col 7 line 4 and col 7 lines 48-67). The collet moves vertically (col 6 lines 2-11). (figures 1, 4, col 1 lines 9-45, col 2 line 60 – col 3 line 27). The bonding materials comprises lead free solder which typically comprises at least two metals with different fusing points. In a rework process the member would be heated again after solidification (col 9 lines 3-9). Although vertical movement is disclosed, there is no positive recitation of pressure.

Yamazaki teaches a conventional bonding process wherein the collet applies heat and pressure to the component (abstract and col 6 lines 32-64).

However the Pb-free solder is not further disclosed.

Powers teaches bonding a semiconductor component with a bonding material comprising at least two elements having different fusing points, including Au/Sn and In, wherein the component is held in place until solidified (paragraphs 10 and 19-21).

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ a lead free solder with at least two metals with different fusing points or a material with a melting point less than eutectic solder to provide reliable, environmentally safe, bonds over a narrow temperature range thereby avoiding damage to the component and substrate (Ho, col 1 lines 10-38 and col 1 line 62 – col 3 line 10).

7. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ho et al. (USPN 6897410 B1) in view of Yamazaki et al. (USPN 6142356) as applied to claims 18-22 and 30 above, and further in view of Kurpiela (USPN 5579979).

Ho teaches a method of mounting a semiconductor component by heating the submount on a heating table and positioning the component which is heated by a collet (12) which has a portion larger than the component (figures 4 and 5) wherein the heaters may be operated simultaneously or separately (col 6 line 40 – col 7 line 4 and col 7 lines 48-67). The collet moves vertically (col 6 lines 2-11). (figures 1, 4, col 1 lines 9-45, col 2 line 60 – col 3 line 27). The bonding materials comprises lead free solder which typically comprises at least two metals with different fusing points. In a rework process the member would be heated again after solidification (col 9 line s3-9). Although vertical movement is disclosed, there is no positive recitation of pressure.

Yamazaki teaches a conventional bonding process wherein the collet applies heat and pressure to the component (abstract and col 6 lines 32-64).

However the collet has a larger portion, a larger contacting side is not disclosed.

Kurpiela teaches a soldering collet comprising a large contacting side (figure 2 and col 2 lines 45-61).

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ a collet with a larger contacting side to facilitate rework (Ho, col 9 lines 3-8).

8. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ho et al. (USPN 6897410 B1) in view of Yamazaki et al. (USPN 6142356) as applied to claims 18-22 and 30 above, and further in view of Laub et al. (USPN 3790738).

Ho teaches a method of mounting a semiconductor component by heating the submount on a heating table and positioning the component which is heated by a collet (12) which has a portion larger than the component (figures 4 and 5) wherein the heaters may be operated simultaneously or separately (col 6 line 40 – col 7 line 4 and col 7 lines 48-67). The collet moves vertically (col 6 lines 2-11). (figures 1, 4, col 1 lines 9-45, col 2 line 60 – col 3 line 27). The bonding materials comprises lead free solder which typically comprises at least two metals with different fusing points. In a rework process the member would be heated again after solidification (col 9 lines 3-9). Although vertical movement is disclosed, there is no positive recitation of pressure.

Yamazaki teaches a conventional bonding process wherein the collet applies heat and pressure to the component (abstract and col 6 lines 32-64).

However the collet material is not disclosed.

Laub teaches a semiconductor bonding method using a low conductivity collet (col 3 lines 35-59 and col 4 lines 5-35) with temperature control (col 7 line 58 – col 8 line 4).

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ a low conductivity collet to prevent thermal damage to the devices.

Response to Arguments

9. Applicant's arguments with respect to claims 1-17 have been considered but are moot in view of the new ground(s) of rejection. It is noted that claims 1-17 have been canceled by applicant.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Spigarelli et al. (USPN 5309545), Yamane et al. (US 2005/0141579 A1).

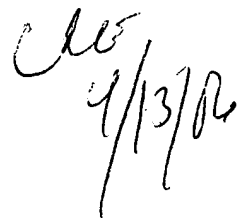
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11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynne Edmondson whose telephone number is (571) 272-1172. The examiner can normally be reached on Monday through Thursday from 6:30 a.m. to 5 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lynne Edmondson
Primary Examiner
Art Unit 1725



LRE